

# CEE 290

## Merging Models With Data

### Instructor

Jasper Vrugt

Engineering Tower #516 / #536 (LAB)

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Lecture, 1 hour; discussion, 20 minutes: ICS 209

### Prerequisite(s):

Computer Modeling, Knowledge of MATLAB, Mathematics

### Course Description:

Topics include local, global and multiple objective optimization, Bayesian statistics using sequential filtering, Markov Chain Monte Carlo simulation, and model averaging. Applications using a wide variety of Earth Science models.

### Recommended book:

Geir Evensen, *Data Assimilation: The Ensemble Kalman Filter*.  
Springer, 2009, ISBN: 3642037100

# **Outline:**

- 1) Linear/nonlinear regression**
- 2) Global Optimization**
- 3) Multi-criteria Optimization**
- 4) Bayesian analysis**
- 5) Data assimilation (nonlinear filtering)**
- 6) Model averaging**
- 7) Likelihood-free inference (diagnostic model evaluation)**
- 8) Informal Bayesian approaches**

## Course Schedule:

Date	Day	Section
April 5	Tuesday	1
April 7	Thursday	1
April 12	Tuesday	2
April 14	Thursday	2
April 19	Tuesday	3
April 21	Thursday	3
April 26	Tuesday	4
April 28	Thursday	4
May 3	Tuesday	5
May 5	Thursday	5
May 10	Tuesday	(5 – 6.20 PM) MIDTERM
May 12	Thursday	6
May 17	Tuesday	REVIEW MIDTERM
May 19	Thursday	6
May 24	Tuesday	7
May 26	Thursday	7
May 31	Tuesday	8
June 2	Thursday	8
June 9	Thursday	(4 – 6.00 PM) (FINAL)

# Grades

Homework (40%)

Midterm (30%)

Final (30%)